

Remarks

Claims 1-10 stand rejected pursuant to under 35 U.S.C. 112, first paragraph, for containing subject matter not described in the specification.

Claims 5, 6, 8, 9, 16, 17, and 18 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter applicant regards as the invention.

Claims 1-19 stand rejected under 35 U.S.C. Section 103(a) as being obvious over U.S. Pat. No. 4,709,472 to Machida et al. (hereinafter Machida), in view of U.S. Pat. No. 5,549,717 to Takeuchi et al. (hereinafter Takeuchi).

Claims 1-5, 11, and 12 stand rejected under 35 U.S.C. Section 103(a) as being obvious over U.S. Pat. No. 3,298,871 to Binder et al. (hereinafter Binder), in view of Takeuchi.

Claims 1, 5, 8, and 16 have been twice amended.

1. Responsive to the rejection of claims 1-10 under 35 U.S.C. 112, first paragraph, twice amended claim 1 is believed to overcome this rejection. The twice amended claim 1 makes a change in the claim language, pursuant to the rejection raised by the Examiner. Twice amended claim 1 now calls for the separator on the longer one of the electrodes to contact both of said oppositely-facing surfaces of said mandrel. This is differs from the once amended claim 1 which called for the longer of the electrodes to contact both of the oppositely facing sides of the mandrel. This change is fully supported by the description and drawings. Applicant respectfully requests reconsideration and withdrawal of the rejection to claims 1-10 as amended.

2. Rejected claims 5, 8, and 16 have been twice amended and are now in a form applicant believes to be patentable. The Examiner rejected these claims on the grounds they failed to point out and distinctly claim the subject matter applicant regards as the invention under 35 U.S.C. 112, second paragraph. The language in these claims the Examiner found unclear, i.e., "an axis about which said electrodes are folded and is formed to have a curved edge surface extending crosswise of said axis," has been amended to read, "an axis in a plane about which said electrodes are folded and has a curved edge surface that lies in a plane which is parallel to the plane containing the axis."

This amendment clarifies the claim language, and simply claims what is fully disclosed in the written description, and Figs. 11-15. An anode cathode subassembly 240 is provided with a curved surface 242, in order to accommodate the curved bottom wall 218 of cell casing 212. The anode 250 has a plurality of scallops 262 along one edge thereof, the cathode 270 has a plurality of scallops 278 along one edge thereof, and the separator 286 has a plurality of scallops 288 along one edge thereof. The electrodes, along with the separator are wound around an axis in a plane, such that the curved edge surface is in a plane parallel to the axis in the plane.

Applicant believes twice amended claims 5, 8, and 16 particularly point out and distinctly claim the invention. Applicant respectfully requests reconsideration of the rejection of claims 5, 8, and 16 as twice amended, and that the rejections of associated dependent claims 6, 9, 17, and 18 be withdrawn, and that all these claims be allowed.

3. Claims 1-19 stand rejected under 35 U.S.C. Section 103(a) as being obvious over Machida in view of Takeuchi.

Machida discloses a method of assembling spiral electrodes. Machida differs from the present invention in significant respects:

a. Machida calls for excessive amounts of separator material, as seen in Fig. 4, to be rolled so as to totally encase the mandrel spool 3, prior to any of the electrode being coiled. The present disclosure is more efficient in that the electrodes are immediately coiled and no separator material is wasted in the rolling process.

b. Machida calls for a two piece mandrel spool which captures the separator material therebetween, so the electrodes and separator "can be tightly wound around the spool," (col. 5, lines 43,44). This implies that the separator material is pinched between the two pieces of the mandrel spool. When the spool is removed, there is a greater chance for the separator material caught between the two spool pieces to not slide off spool, thus causing the coiled electrode assembly to unravel.

c. Machida does not disclose that a rectangular mandrel may be employed, such that the electrode may be folded in on itself to form a protective pocket around the mandrel, greatly reducing the risk of a short circuit.

The Examiner also cites Takeuchi, a patent drawn to a method for making a prismatic cell. Again, there are significant differences between the Takeuchi patent and the present disclosure. Takeuchi does not disclose that one of the electrodes may be longer than the other, such that it can be folded in on itself to form a rectangular pocket at the innermost portion of the assembly, as the present invention calls for. This aspect of the present invention reduces the chance of a short circuit in the assembly when the mandrel is removed after winding. For example, if some of the separator material is damaged when the mandrel is removed, no harm is done, since only like electrodes can contact one another.

Applicant believes there is no teaching, suggestion, or motivation to combine the Machida and Takeuchi references as was done in the Final Office Action. There is nothing in either of the patents teaching or suggesting the combining of the references, as there is no clear and particular showing of combinability of the references. Rather, the references teach away from combinability in the sense that Machida makes use of a two part spool to accomplish winding, whereas Takeuchi makes use of a mandrel having a substantially rectangular cross section.

Also, the Examiner notes, in Machida, col.5, line 62, col.6, line 17, and Fig. 6, that the longer electrode is wound around the mandrel separately before winding of the second electrode. However, applicant notes that it is the separator material in Machida that is wound around the mandrel before the winding of the electrode. Machida does not teach that a single electrode may be wrapped upon itself to form a pocket surrounding the mandrel, as is taught by the present invention.

Neither Machida nor Takeuchi shows, teach, or suggest that an electrode may be folded in upon itself around a mandrel, as is claimed in the present invention, which weighs heavily in favor of finding nonobviousness.

Thus for these reasons, the applicant believes claims 1-19, as amended, are nonobvious, and respectfully requests reconsideration and withdrawal of the rejection of these claims.

4. Claims 1-5, 11, and 12 stand rejected under 35 U.S.C. Section 103(a) as being obvious over Binder, in view of Takeuchi.

Binder teaches a negative electrode 2 and a positive electrode 3, separated by separator layers 4 and 5. A protective sheet is positioned on the longest electrode (negative electrode 2), and this is to be inserted into the mandrel. The protective sheet 7 spans a length 7a of electrode 2, the cut edge of the

electrode 7b, and a part 7c on the other side of the sheet 7, as seen in Figs. 1 and 2. Protective sheets 8 and 9 are placed on the ends of the positive electrode 3. The protective sheet 7 may be made of regenerated cellulose, (page 3, lines 39-41). There are two half cylinders 10 and 11 that capture therebetween the separator.

There are significant differences between Binder and the present invention. Binder does not show a cathode, an anode, with a separator therebetween, wound in a jellyroll configuration to define a substantially rectangular shaped pocket. Binder also does not disclose wrapping an electrode upon itself to eliminate the possibility of a short circuit in the wrapped assembly. Rather, Binder makes use of a plurality of protective sheets 7,8,9 at the ends of the electrodes, and at the point where the mandrel winds the electrodes, Fig. 1. These protective sheets can only add to the expense and time needed to make and use the Binder device, because they are in addition to the separator Binder calls for between the electrodes. The present invention is much more efficient as it does not call for protective sheets.

Additionally, applicant believes there is no teaching, suggestion, or motivation to combine the Takeuchi and Binder references as done in the Final Office Action. There is nothing in either of the patents teaching or suggesting the combining of the references, as there is no clear and particular showing of combinability of the references. Rather, the references teach away from combinability in the sense that Binder makes use of a two part spool to accomplish winding, whereas Takeuchi makes use of a mandrel having a substantially rectangular cross section. The references further teach away from combinability in the sense that Binder discusses in detail the need for the protective sheets 7a, 7b, 7c, 8, and 9 to protect the electrodes from being damaged during winding, and while the cylindrical mandrel is removed, while Takeuchi does not call for these protective sheets.

Takeuchi calls for the anode cathode assembly to be compressed to form a rectangular cross section, col.6, lines 63-67. If the Binder and Takeuchi references were hypothetically combined, the result would be compressing the wound assembly of Binder, to form a substantially rectangular shape. However, if this were done, the protective sheets 7a, 7b, 7c, 8 and 9, which are made of cellulose (page 3, ln 39-44), would be crushed, and forced be into the very electrodes (2,3) there were intended to protect. The damage to these electrodes would possibly cause short circuits in the cell, and render the device unworkable. Hence applicant does not believe the Takeuchi and Binder devices are combinable. Thus, the applicant believes the significant differences between the claim 1-5, 11, 12 and the Takeuchi, Binder references weighs heavily in favor of finding nonobviousness.

Reconsideration of the rejection of claims 1-5, 11 and 12 as amended is respectfully requested.

The amendments to claims 1, 5, 8, and 16 presented herein are exclusively in respect to the 35 U.S.C. section 112 rejections, and therefore are believed to be amendments complying with the requirements of form contemplated by 37 C.F.R. 1.116. Accordingly, the amendments are believed to not raise any new issues and entry of these amendments under 37 C.F.R. 1.116 is respectfully requested.

Favorable action on this application is respectfully requested.

Respectfully submitted,  
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